

$\rho_3(1690)$ $I^G(J^{PC}) = 1^+(3^-^-)$

NODE=M015

 $\rho_3(1690)$ MASS

VALUE (MeV)

DOCUMENT ID

1688.8±2.1 OUR AVERAGE Includes data from the 5 datablocks that follow this one. **2π MODE**

VALUE (MeV)

EVTS

DOCUMENT ID

TECN

CHG

COMMENT

The data in this block is included in the average printed for a previous datablock.

NODE=M015205

NODE=M015M

1686± 4 OUR AVERAGE

1677±14		EVANGELIS...	81	OMEG	-	12 $\pi^- p \rightarrow 2\pi p$
1679±11	476	BALTAY	78B	HBC	0	15 $\pi^+ p \rightarrow \pi^+ \pi^- n$
1678±12	175	¹ ANTIPOV	77	CIBS	0	25 $\pi^- p \rightarrow p 3\pi$
1690± 7	600	¹ ENGLER	74	DBC	0	6 $\pi^+ n \rightarrow \pi^+ \pi^- p$
1693± 8		² GRAYER	74	ASPK	0	17 $\pi^- p \rightarrow \pi^+ \pi^- n$
1678±12		MATTHEWS	71C	DBC	0	7 $\pi^+ N$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1734±10		³ CORDEN	79	OMEG		12-15 $\pi^- p \rightarrow n 2\pi$
1692±12		^{2,4} ESTABROOKS	75	RVUE		17 $\pi^- p \rightarrow \pi^+ \pi^- n$
1737±23		ARMENISE	70	DBC	0	9 $\pi^+ N$
1650±35	122	BARTSCH	70B	HBC	+	8 $\pi^+ p \rightarrow N 2\pi$
1687±21		STUNTEBECK	70	HDBC	0	8 $\pi^- p$, 5.4 $\pi^+ d$
1683±13		ARMENISE	68	DBC	0	5.1 $\pi^+ d$
1670±30		GOLDBERG	65	HBC	0	6 $\pi^+ d$, 8 $\pi^- p$

¹ Mass errors enlarged by us to Γ/\sqrt{N} ; see the note with the $K^*(892)$ mass.² Uses same data as HYAMS 75.³ From a phase shift solution containing a $f'_2(1525)$ width two times larger than the $K\bar{K}$ result.⁴ From phase-shift analysis. Error takes account of spread of different phase-shift solutions.

NODE=M015M1

NODE=M015M1

 $K\bar{K}$ AND $K\bar{K}\pi$ MODES

VALUE (MeV)

EVTS

DOCUMENT ID

TECN

CHG

COMMENT

The data in this block is included in the average printed for a previous datablock.

NODE=M015M1;LINKAGE=E

NODE=M015M1;LINKAGE=G

NODE=M015M1;LINKAGE=M

NODE=M015M1;LINKAGE=I

NODE=M015M2

NODE=M015M2

1696± 4 OUR AVERAGE

1699± 5		ALPER	80	CNTR	0	62 $\pi^- p \rightarrow K^+ K^- n$
1698±12	6k	^{5,6} MARTIN	78D	SPEC		10 $\pi p \rightarrow K_S^0 K^- p$
1692± 6		BLUM	75	ASPK	0	18.4 $\pi^- p \rightarrow n K^+ K^-$
1690±16		ADERHOLZ	69	HBC	+	8 $\pi^+ p \rightarrow K\bar{K}\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1694± 8		⁷ COSTA...	80	OMEG		10 $\pi^- p \rightarrow K^+ K^- n$

⁵ From a fit to $J^P = 3^-$ partial wave.⁶ Systematic error on mass scale subtracted.⁷ They cannot distinguish between $\rho_3(1690)$ and $\omega_3(1670)$.

NODE=M015M2;LINKAGE=P

NODE=M015M2;LINKAGE=S

NODE=M015M2;LINKAGE=L

(4π) $^\pm$ MODE

VALUE (MeV)

EVTS

DOCUMENT ID

TECN

CHG

COMMENT

The data in this block is included in the average printed for a previous datablock.

NODE=M015M3

NODE=M015M3

1686± 5 OUR AVERAGE Error includes scale factor of 1.1.

1694± 6		⁸ EVANGELIS...	81	OMEG	-	12 $\pi^- p \rightarrow p 4\pi$
1665±15	177	BALTAY	78B	HBC	+	15 $\pi^+ p \rightarrow p 4\pi$
1670±10		THOMPSON	74	HBC	+	13 $\pi^+ p$
1687±20		CASON	73	HBC	-	8,18.5 $\pi^- p$
1685±14		⁹ CASON	73	HBC	-	8,18.5 $\pi^- p$
1680±40	144	BARTSCH	70B	HBC	+	8 $\pi^+ p \rightarrow N 4\pi$
1689±20	102	⁹ BARTSCH	70B	HBC	+	8 $\pi^+ p \rightarrow N 2\rho$
1705±21		CASO	70	HBC	-	11.2 $\pi^- p \rightarrow n \rho 2\pi$

OCCUR=2

OCCUR=3

• • • We do not use the following data for averages, fits, limits, etc. • • •

1718±10	¹⁰ EVANGELIS...	81	OMEG	—	12 $\pi^- p \rightarrow p 4\pi$	OCCUR=2
1673± 9	¹¹ EVANGELIS...	81	OMEG	—	12 $\pi^- p \rightarrow p 4\pi$	OCCUR=3
1733± 9	66 ⁹ KLIGER	74	HBC	—	4.5 $\pi^- p \rightarrow p 4\pi$	
1630±15	HOLMES	72	HBC	+	10-12 $K^+ p$	
1720±15	BALTAY	68	HBC	+	7, 8.5 $\pi^+ p$	

⁸ From $\rho^- \rho^0$ mode, not independent of the other two EVANGELISTA 81 entries.

⁹ From $\rho^\pm \rho^0$ mode.

¹⁰ From $a_2(1320)^- \pi^0$ mode, not independent of the other two EVANGELISTA 81 entries.

¹¹ From $a_2(1320)^0 \pi^-$ mode, not independent of the other two EVANGELISTA 81 entries.

$\omega\pi$ MODE

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
The data in this block is included in the average printed for a previous datablock.				

1681± 7 OUR AVERAGE

1670±25	¹² ALDE	95	GAM2	38 $\pi^- p \rightarrow \omega \pi^0 n$	
1690±15	EVANGELIS...	81	OMEG	—	12 $\pi^- p \rightarrow \omega \pi p$
1666±14	GESSAROLI	77	HBC	—	11 $\pi^- p \rightarrow \omega \pi p$
1686± 9	THOMPSON	74	HBC	+	13 $\pi^+ p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1654±24	BARNHAM	70	HBC	+	10 $K^+ p \rightarrow \omega \pi X$

¹² Supersedes ALDE 92C.

$\eta\pi^+\pi^-$ MODE

(For difficulties with MMS experiments, see the $a_2(1320)$ mini-review in the 1973 edition.)

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
The data in this block is included in the average printed for a previous datablock.				

1682±12 OUR AVERAGE

1685±10±20	AMELIN	00	VES	37 $\pi^- p \rightarrow \eta \pi^+ \pi^- n$	
1680±15	FUKUI	88	SPEC	0 8.95 $\pi^- p \rightarrow \eta \pi^+ \pi^- n$	

• • • We do not use the following data for averages, fits, limits, etc. • • •

1700±47	¹³ ANDERSON	69	MMS	—	16 $\pi^- p$ backward
1632±15	^{13,14} FOCACCI	66	MMS	—	7-12 $\pi^- p \rightarrow p \text{MM}$
1700±15	^{13,14} FOCACCI	66	MMS	—	7-12 $\pi^- p \rightarrow p \text{MM}$
1748±15	^{13,14} FOCACCI	66	MMS	—	7-12 $\pi^- p \rightarrow p \text{MM}$

¹³ Seen in 2.5-3 GeV/c $\bar{p}p$. $2\pi^+ 2\pi^-$, with 0, 1, 2 $\pi^+ \pi^-$ pairs in ρ band not seen by OREN 74 (2.3 GeV/c $\bar{p}p$) with more statistics. (Jan. 1976)

¹⁴ Not seen by BOWEN 72.

$\rho_3(1690)$ WIDTH

2π , $K\bar{K}$, AND $K\bar{K}\pi$ MODES

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
161±10 OUR AVERAGE Includes data from the 5 datablocks that follow this one. Error includes scale factor of 1.5. See the ideogram below.				

NODE=M015M3;LINKAGE=A
NODE=M015M3;LINKAGE=F
NODE=M015M3;LINKAGE=B
NODE=M015M3;LINKAGE=C

NODE=M015M5
NODE=M015M5

NODE=M015M5;LINKAGE=A

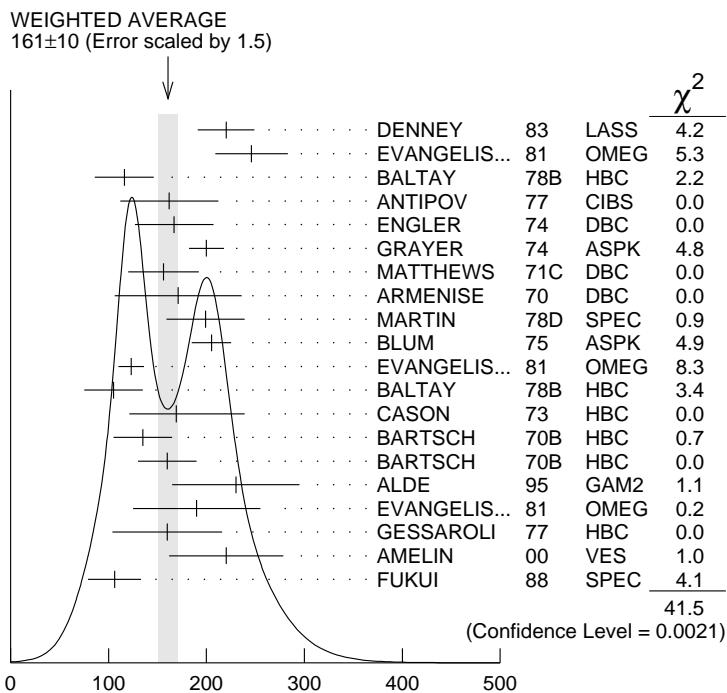
NODE=M015M6
NODE=M015M6
NODE=M015M6

NODE=M015M6;LINKAGE=R

NODE=M015M6;LINKAGE=N

NODE=M015210

NODE=M015W
NODE=M015W



$\rho_3(1690)$ width, 2π , $K\bar{K}$, and $K\bar{K}\pi$ modes (MeV)

2π MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
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The data in this block is included in the average printed for a previous datablock.

NODE=M015W1
NODE=M015W1

186±14 OUR AVERAGE Error includes scale factor of 1.3. See the ideogram below.

220±29		DENNEY	83	LASS	10 $\pi^+ N$
246±37		EVANGELIS...	81	OMEG	— 12 $\pi^- p \rightarrow 2\pi p$
116±30	476	BALTAY	78B	HBC	0 15 $\pi^+ p \rightarrow \pi^+ \pi^- n$
162±50	175	¹⁵ ANTIPOV	77	CIBS	0 25 $\pi^- p \rightarrow p 3\pi$
167±40	600	ENGLER	74	DBC	0 6 $\pi^+ n \rightarrow \pi^+ \pi^- p$
200±18		¹⁶ GRAYER	74	ASPK	0 17 $\pi^- p \rightarrow \pi^+ \pi^- n$
156±36		MATTHEWS	71C	DBC	0 7 $\pi^+ N$
171±65		ARMENISE	70	DBC	0 9 $\pi^+ d$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
322±35		¹⁷ CORDEN	79	OMEG	12–15 $\pi^- p \rightarrow n 2\pi$
240±30		16,18 ESTABROOKS	75	RVUE	17 $\pi^- p \rightarrow \pi^+ \pi^- n$
180±30	122	BARTSCH	70B	HBC	+ 8 $\pi^+ p \rightarrow N 2\pi$
267 ⁺⁷² ₋₄₆		STUNTEBECK	70	HDBC	0 8 $\pi^- p$, 5.4 $\pi^+ d$
188±49		ARMENISE	68	DBC	0 5.1 $\pi^+ d$
180±40		GOLDBERG	65	HBC	0 6 $\pi^+ d$, 8 $\pi^- p$

¹⁵ Width errors enlarged by us to $4\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass.

¹⁶ Uses same data as HYAMS 75 and BECKER 79.

¹⁷ From a phase shift solution containing a $f'_2(1525)$ width two times larger than the $K\bar{K}$ result.

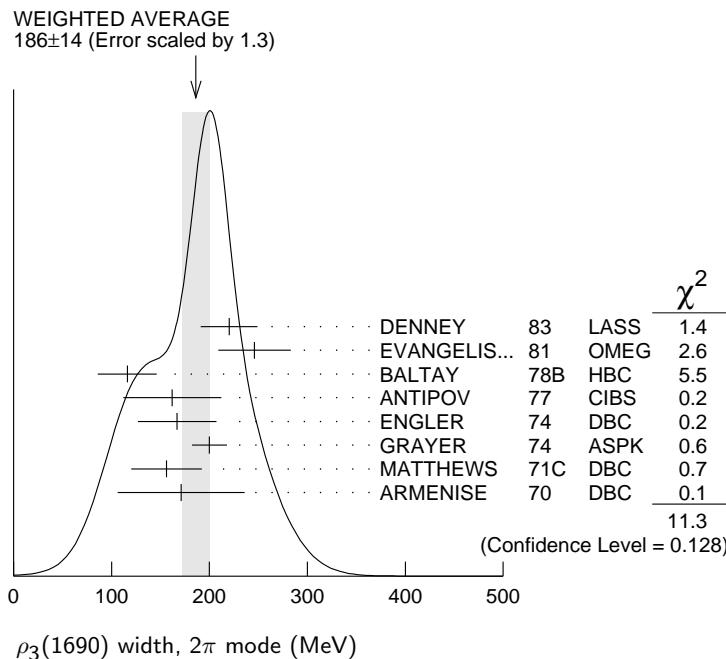
¹⁸ From phase-shift analysis. Error takes account of spread of different phase-shift solutions.

NODE=M015W1;LINKAGE=T

NODE=M015W1;LINKAGE=G

NODE=M015W1;LINKAGE=M

NODE=M015W1;LINKAGE=I



KK AND KKpi MODES

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
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The data in this block is included in the average printed for a previous datablock.

NODE=M015W2
NODE=M015W2

204±18 OUR AVERAGE

199±40	6000	19 MARTIN	78D	SPEC	10 $\pi^+ p \rightarrow K_S^0 K^- p$
205±20		BLUM	75	ASPK	0 18.4 $\pi^- p \rightarrow n K^+ K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
219±4		ALPER	80	CNTR	0 62 $\pi^- p \rightarrow K^+ K^- n$
186±11		20 COSTA...	80	OMEG	10 $\pi^- p \rightarrow K^+ K^- n$
112±60		ADERHOLZ	69	HBC	+ 8 $\pi^+ p \rightarrow K\bar{K}\pi$

19 From a fit to $J^P = 3^-$ partial wave.

20 They cannot distinguish between $\rho_3(1690)$ and $\omega_3(1670)$.

NODE=M015W2;LINKAGE=P
NODE=M015W2;LINKAGE=L

(4pi)± MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
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The data in this block is included in the average printed for a previous datablock.

NODE=M015W3
NODE=M015W3

129±10 OUR AVERAGE

123±13	21	EVANGELIS...	81	OMEG	- 12 $\pi^- p \rightarrow p4\pi$
105±30	177	BALTAY	78B	HBC	+ 15 $\pi^+ p \rightarrow p4\pi$
169±70		CASON	73	HBC	- 8,18.5 $\pi^- p$
135±30	144	BARTSCH	70B	HBC	+ 8 $\pi^+ p \rightarrow N4\pi$
160±30	102	BARTSCH	70B	HBC	+ 8 $\pi^+ p \rightarrow N2\rho$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
230±28	22	EVANGELIS...	81	OMEG	- 12 $\pi^- p \rightarrow p4\pi$
184±33	23	EVANGELIS...	81	OMEG	- 12 $\pi^- p \rightarrow p4\pi$
150	66	24 KLIGER	74	HBC	- 4.5 $\pi^- p \rightarrow p4\pi$
106±25		THOMPSON	74	HBC	+ 13 $\pi^+ p$
125±83	24	CASON	73	HBC	- 8,18.5 $\pi^- p$
130±30		HOLMES	72	HBC	+ 10-12 $K^+ p$
180±30	90	24 BARTSCH	70B	HBC	+ 8 $\pi^+ p \rightarrow N\alpha_2\pi$
100±35		BALTAY	68	HBC	+ 7, 8.5 $\pi^+ p$

OCCUR=2

OCCUR=3

OCCUR=2

OCCUR=2

21 From $\rho^- \rho^0$ mode, not independent of the other two EVANGELISTA 81 entries.

22 From $\alpha_2(1320)^-\pi^0$ mode, not independent of the other two EVANGELISTA 81 entries.

23 From $\alpha_2(1320)^0\pi^-$ mode, not independent of the other two EVANGELISTA 81 entries.

24 From $\rho^\pm \rho^0$ mode.

NODE=M015W3;LINKAGE=A

NODE=M015W3;LINKAGE=B

NODE=M015W3;LINKAGE=C

NODE=M015W3;LINKAGE=F

$\omega\pi$ MODEVALUE (MeV)DOCUMENT IDTECNCHGCOMMENT

The data in this block is included in the average printed for a previous datablock.

190±40 OUR AVERAGE

230±65	25 ALDE	95 GAM2	38 $\pi^- p \rightarrow \omega\pi^0 n$
190±65	EVANGELIS...	81 OMEG	— 12 $\pi^- p \rightarrow \omega\pi p$
160±56	GESSAROLI	77 HBC	11 $\pi^- p \rightarrow \omega\pi p$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
89±25	THOMPSON	74 HBC	+ 13 $\pi^+ p$
130 ⁺⁷³ ₋₄₃	BARNHAM	70 HBC	+ 10 $K^+ p \rightarrow \omega\pi X$

25 Supersedes ALDE 92C.

NODE=M015W5

NODE=M015W5

 $\eta\pi^+\pi^-$ MODE(For difficulties with MMS experiments, see the $a_2(1320)$ mini-review in the 1973 edition.)VALUE (MeV)DOCUMENT IDTECNCHGCOMMENT

The data in this block is included in the average printed for a previous datablock.

NODE=M015W5;LINKAGE=A

NODE=M015W6

NODE=M015W6

NODE=M015W6

126±40 OUR AVERAGE Error includes scale factor of 1.8.

220±30±50	AMELIN	00 VES	37 $\pi^- p \rightarrow \eta\pi^+\pi^- n$
106±27	FUKUI	88 SPEC	0 8.95 $\pi^- p \rightarrow \eta\pi^+\pi^- n$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
195	26 ANDERSON	69 MMS	— 16 $\pi^- p$ backward
< 21	26,27 FOCACCI	66 MMS	— 7–12 $\pi^- p \rightarrow p\text{MM}$
< 30	26,27 FOCACCI	66 MMS	— 7–12 $\pi^- p \rightarrow p\text{MM}$
< 38	26,27 FOCACCI	66 MMS	— 7–12 $\pi^- p \rightarrow p\text{MM}$

26 Seen in 2.5–3 GeV/c $\bar{p}p$. $2\pi^+ 2\pi^-$, with 0, 1, 2 $\pi^+ \pi^-$ pairs in ρ^0 band not seen by OREN 74 (2.3 GeV/c $\bar{p}p$) with more statistics. (Jan. 1979)

27 Not seen by BOWEN 72.

OCCUR=2

OCCUR=3

NODE=M015W6;LINKAGE=R

NODE=M015W6;LINKAGE=N

NODE=M015215;NODE=M015

 $\rho_3(1690)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)	Scale factor
$\Gamma_1 4\pi$	(71.1 ± 1.9) %	
$\Gamma_2 \pi^\pm \pi^+ \pi^- \pi^0$	(67 ± 22) %	
$\Gamma_3 \omega\pi$	(16 ± 6) %	
$\Gamma_4 \pi\pi$	(23.6 ± 1.3) %	
$\Gamma_5 K\bar{K}\pi$	(3.8 ± 1.2) %	
$\Gamma_6 K\bar{K}$	(1.58 ± 0.26) %	1.2
$\Gamma_7 \eta\pi^+\pi^-$	seen	
$\Gamma_8 \rho(770)\eta$	seen	
$\Gamma_9 \pi\pi\rho$	seen	
Excluding 2ρ and $a_2(1320)\pi$.		
$\Gamma_{10} a_2(1320)\pi$	seen	
$\Gamma_{11} \rho\rho$	seen	
$\Gamma_{12} \phi\pi$		
$\Gamma_{13} \eta\pi$		
$\Gamma_{14} \pi^\pm 2\pi^+ 2\pi^- \pi^0$		

DESIG=2

DESIG=11

DESIG=7

DESIG=1

DESIG=3

DESIG=4

DESIG=13

DESIG=14;OUR EST;→ UNCHECKED ←

DESIG=5;OUR EST;→ UNCHECKED ←

DESIG=6;OUR EST;→ UNCHECKED ←

DESIG=8;OUR EST;→ UNCHECKED ←

DESIG=9

DESIG=10

DESIG=12

CONSTRAINED FIT INFORMATION

An overall fit to 5 branching ratios uses 10 measurements and one constraint to determine 4 parameters. The overall fit has a $\chi^2 = 14.7$ for 7 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\langle \delta x_i \delta x_j \rangle / (\delta x_i \cdot \delta x_j)$, in percent, from the fit to the branching fractions, $x_i \equiv \Gamma_i / \Gamma_{\text{total}}$. The fit constrains the x_i whose labels appear in this array to sum to one.

x_4	-77			
x_5	-74	17		
x_6	-15	2	0	
	x_1	x_4	x_5	

$\rho_3(1690)$ BRANCHING RATIOS

$\Gamma(\pi\pi)/\Gamma_{\text{total}}$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
0.236 ± 0.013 OUR FIT				
0.243 ± 0.013 OUR AVERAGE				

$0.259^{+0.018}_{-0.019}$	BECKER	79	ASPK	0	$17 \pi^- p$ polarized
0.23 ± 0.02	CORDEN	79	OMEG		$12-15 \pi^- p \rightarrow n 2\pi$
0.22 ± 0.04	²⁸ MATTHEWS	71C	HDBC	0	$7 \pi^+ n \rightarrow \pi^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.245 ± 0.006	²⁹ ESTABROOKS	75	RVUE		$17 \pi^- p \rightarrow \pi^+ \pi^- n$

28 One-pion-exchange model used in this estimation.

29 From phase-shift analysis of HYAMS 75 data.

$\Gamma(\pi\pi)/\Gamma(\pi^\pm \pi^+ \pi^- \pi^0)$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
0.35 ± 0.11	CASON	73	HBC	-

• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.2	HOLMES	72	HBC	+	$10-12 K^+ p$
<0.12	BALLAM	71B	HBC	-	$16 \pi^- p$

$\Gamma(\pi\pi)/\Gamma(4\pi)$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
0.332 ± 0.026 OUR FIT	Error includes scale factor of 1.1.			

0.30 ± 0.10	BALTAY	78B	HBC	0	$15 \pi^+ p \rightarrow p 4\pi$
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$\Gamma(K\bar{K})/\Gamma(\pi\pi)$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
0.067 ± 0.011 OUR FIT	Error includes scale factor of 1.2.			

0.118^{+0.040}_{-0.032} OUR AVERAGE Error includes scale factor of 1.7. See the ideogram below.

$0.191^{+0.040}_{-0.037}$	GORLICH	80	ASPK	0	$17,18 \pi^- p$ polarized
0.08 ± 0.03	BARTSCH	70B	HBC	+	$8 \pi^+ p$
$0.08^{+0.08}_{-0.03}$	CRENNELL	68B	HBC		$6.0 \pi^- p$

NODE=M015220

NODE=M015R1

NODE=M015R1

NODE=M015R1;LINKAGE=P

NODE=M015R1;LINKAGE=G

NODE=M015R2

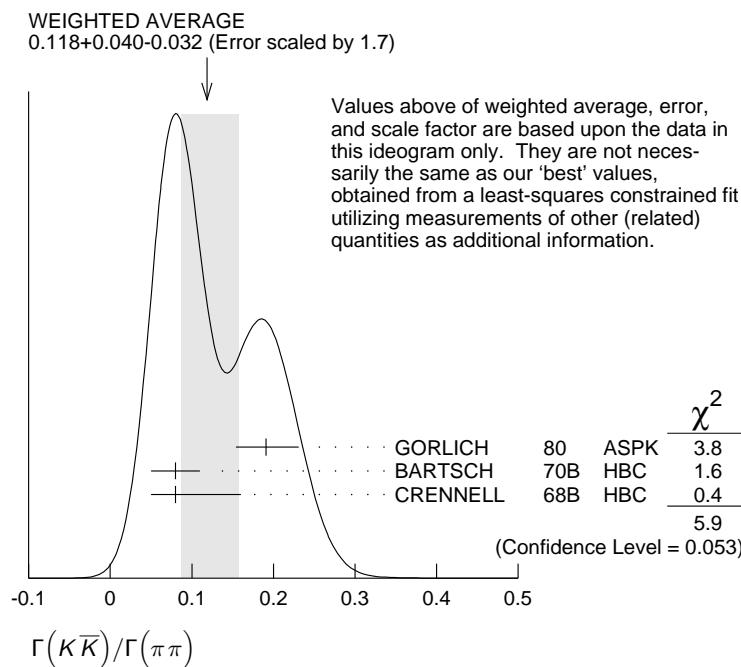
NODE=M015R2

NODE=M015R3

NODE=M015R3

NODE=M015R4

NODE=M015R4

 $\Gamma(K\bar{K}\pi)/\Gamma(\pi\pi)$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
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0.16±0.05 OUR FIT**0.16±0.05**

DOCUMENT ID	TECN	CHG	COMMENT
30 BARTSCH	70B HBC	+	$8\pi^+ p$

30 Increased by us to correspond to $B(p_3(1690) \rightarrow \pi\pi) = 0.24$. Γ_5/Γ_4 NODE=M015R5
NODE=M015R5 $[\Gamma(\pi\pi\rho) + \Gamma(a_2(1320)\pi) + \Gamma(\rho\rho)]/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
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0.94±0.09 OUR AVERAGE

0.96±0.21

0.88±0.15

1 ± 0.15

consistent with 1

DOCUMENT ID	TECN	CHG	COMMENT
BALTAY	78B HBC	+	$15\pi^+ p \rightarrow p4\pi$
BALLAM	71B HBC	-	$16\pi^- p$
BARTSCH	70B HBC	+	$8\pi^+ p$
CASO	68 HBC	-	$11\pi^- p$

 $(\Gamma_9 + \Gamma_{10} + \Gamma_{11})/\Gamma_2$ NODE=M015R6
NODE=M015R6 $\Gamma(\rho\rho)/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)$

VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.12±0.11

0.56

0.13±0.09

0.7 ± 0.15

31 $\rho\rho$ and $a_2(1320)\pi$ modes are indistinguishable.

DOCUMENT ID	TECN	CHG	COMMENT
BALTAY	78B HBC	+	$15\pi^+ p \rightarrow p4\pi$
KLIGER	74 HBC	-	$4.5\pi^- p \rightarrow p4\pi$
THOMPSON	74 HBC	+	$13\pi^+ p$
BARTSCH	70B HBC	+	$8\pi^+ p$

 Γ_{11}/Γ_2 NODE=M015R7
NODE=M015R7 $\Gamma(\rho\rho)/[\Gamma(\pi\pi\rho) + \Gamma(a_2(1320)\pi) + \Gamma(\rho\rho)]$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.48±0.16

DOCUMENT ID	TECN	CHG	COMMENT
CASO	68 HBC	-	$11\pi^- p$

 $\Gamma_{11}/(\Gamma_9 + \Gamma_{10} + \Gamma_{11})$ NODE=M015R8
NODE=M015R8 $\Gamma(a_2(1320)\pi)/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.66±0.08

0.36±0.14

not seen

0.6 ± 0.15

0.6

DOCUMENT ID	TECN	CHG	COMMENT
BALTAY	78B HBC	+	$15\pi^+ p \rightarrow p4\pi$
THOMPSON	74 HBC	+	$13\pi^+ p$
CASON	73 HBC	-	$8,18.5\pi^- p$
BARTSCH	70B HBC	+	$8\pi^+ p$
BALTAY	68 HBC	+	$7,8.5\pi^+ p$

 Γ_{10}/Γ_2 NODE=M015R9
NODE=M015R932 $\rho\rho$ and $a_2(1320)\pi$ modes are indistinguishable.

NODE=M015R9;LINKAGE=T

$\Gamma(\omega\pi)/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)$

VALUE	CL%	DOCUMENT ID	TECN	CHG	COMMENT
0.23±0.05 OUR AVERAGE					
0.33±0.07		THOMPSON 74	HBC	+	13 $\pi^+ p$
0.12±0.07		BALLAM 71B	HBC	-	16 $\pi^- p$
0.25±0.10		BALTAY 68	HBC	+	7.8.5 $\pi^+ p$
0.25±0.10		JOHNSTON 68	HBC	-	7.0 $\pi^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.11	95	BALTAY	78B	HBC	+ 15 $\pi^+ p \rightarrow p4\pi$
<0.09		KLIGER	74	HBC	- 4.5 $\pi^- p \rightarrow p4\pi$

 Γ_3/Γ_2 NODE=M015R10
NODE=M015R10 $\Gamma(\phi\pi)/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.11	BALTAY 68	HBC	+	7.8.5 $\pi^+ p$

 Γ_{12}/Γ_2 NODE=M015R11
NODE=M015R11 $\Gamma(\pi^\pm 2\pi^+ 2\pi^- \pi^0)/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.15	BALTAY 68	HBC	+	7.8.5 $\pi^+ p$

 Γ_{14}/Γ_2 NODE=M015R12
NODE=M015R12 $\Gamma(\eta\pi)/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.02	THOMPSON 74	HBC	+	13 $\pi^+ p$

 Γ_{13}/Γ_2 NODE=M015R13
NODE=M015R13 $\Gamma(K\bar{K})/\Gamma_{\text{total}}$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
0.0158±0.0026 OUR FIT Error includes scale factor of 1.2.				
0.0130±0.0024 OUR AVERAGE				
0.013 ± 0.003	COSTA...	80	OMEG 0	10 $\pi^- p \rightarrow K^+ K^- n$
0.013 ± 0.004	33 MARTIN	78B	SPEC	- 10 $\pi p \rightarrow K_S^0 K^- p$

 Γ_6/Γ NODE=M015R14
NODE=M015R1433 From $(\Gamma_4\Gamma_6)^{1/2} = 0.056 \pm 0.034$ assuming $B(\rho_3(1690) \rightarrow \pi\pi) = 0.24$. $\Gamma(\omega\pi)/[\Gamma(\omega\pi) + \Gamma(\rho\rho)]$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.22±0.08	CASON 73	HBC	-	8.18.5 $\pi^- p$

 $\Gamma_3/(\Gamma_3+\Gamma_{11})$ NODE=M015R16
NODE=M015R16 $\Gamma(\eta\pi^+\pi^-)/\Gamma_{\text{total}}$

VALUE	DOCUMENT ID	TECN	COMMENT
seen	FUKUI 88	SPEC	8.95 $\pi^- p \rightarrow \eta\pi^+\pi^- n$

 Γ_7/Γ NODE=M015R17
NODE=M015R17 $\Gamma(a_2(1320)\pi)/\Gamma(\rho(770)\eta)$

VALUE	DOCUMENT ID	TECN	COMMENT
5.5±2.0	AMELIN 00	VES	37 $\pi^- p \rightarrow \eta\pi^+\pi^- n$

 Γ_{10}/Γ_8 NODE=M015R18
NODE=M015R18 $\rho_3(1690)$ REFERENCES

AMELIN	00	NP A668 83	D. Amelin <i>et al.</i>	(VES Collab.)
ALDE	95	ZPHY C66 379	D.M. Alde <i>et al.</i>	(GAMS Collab.) JP
ALDE	92C	ZPHY C54 553	D.M. Alde <i>et al.</i>	(BELG, SERP, KEK, LANL+)
FUKUI	88	PL B202 441	S. Fukui <i>et al.</i>	(SUGI, NAGO, KEK, KYOT+)
DENNEY	83	PR D28 2726	D.L. Denney <i>et al.</i>	(IOWA, MICH)
EVANGELIS...	81	NP B178 197	C. Evangelista <i>et al.</i>	(BARI, BONN, CERN+)
ALPER	80	PL 94B 422	B. Alper <i>et al.</i>	(AMST, CERN, CRAC, MPIM+)
COSTA...	80	NP B175 402	G. Costa de Beauregard <i>et al.</i>	(BARI, BONN+)
GORLICH	80	NP B174 16	L. Gorlich <i>et al.</i>	(CRAC, MPIM, CERN+)
BECKER	79	NP B151 46	H. Becker <i>et al.</i>	(MPIM, CERN, ZEEM, CRAC)
CORDEN	79	NP B157 250	M.J. Corden <i>et al.</i>	(BIRM, RHEL, TELA+) JP
BALTAY	78B	PR D17 62	C. Baltay <i>et al.</i>	(COLU, BING)
MARTIN	78B	NP B140 158	A.D. Martin <i>et al.</i>	(DURH, GEVA)
MARTIN	78D	PL 74B 417	A.D. Martin <i>et al.</i>	(DURH, GEVA)
ANTIPOV	77	NP B119 45	Y.M. Antipov <i>et al.</i>	(SERP, GEVA)
GESSAROLI	77	NP B126 382	R. Gessaroli <i>et al.</i>	(BGNA, FIRZ, GENO+)
BLUM	75	PL 57B 403	W. Blum <i>et al.</i>	(CERN, MPIM) JP
ESTABROOKS	75	NP B95 322	P.G. Estabrooks, A.D. Martin	(DURH)
HYAMS	75	NP B100 205	B.D. Hyams <i>et al.</i>	(CERN, MPIM)
ENGLER	74	PR D10 2070	A. Engler <i>et al.</i>	(CMU, CASE)

NODE=M015

REFID=47432
REFID=44371
REFID=41859
REFID=40273
REFID=20754
REFID=20462
REFID=21665
REFID=20737
REFID=20738
REFID=21084
REFID=20374
REFID=21265
REFID=21273
REFID=21272
REFID=20728
REFID=20230
REFID=21651
REFID=20642
REFID=20355
REFID=20110

GRAYER	74	NP B75 189	G. Grayer <i>et al.</i>	(CERN, MPIM)	REFID=20113
KLIGER	74	SJNP 19 428	G.K. Klinger <i>et al.</i>	(ITEP)	REFID=21648
		Translated from YAF 19 839			
OREN	74	NP B71 189	Y. Oren <i>et al.</i>	(ANL, OXF)	REFID=20221
THOMPSON	74	NP B69 220	G. Thompson <i>et al.</i>	(PURD)	REFID=21650
CASON	73	PR D7 1971	N.M. Cason <i>et al.</i>	(NDAM)	REFID=20606
BOWEN	72	PRC 29 890	D.R. Bowen <i>et al.</i>	(NEAS, STON)	REFID=21711
HOLMES	72	PR D6 3336	R. Holmes <i>et al.</i>	(ROCH)	REFID=21639
BALLAM	71B	PR D3 2606	J. Ballam <i>et al.</i>	(SLAC)	REFID=21630
MATTHEWS	71C	NP B33 1	J.A.J. Matthews <i>et al.</i>	(TNTO, WISC) JP	REFID=21633
ARMENISE	70	LNC 4 199	N. Armenise <i>et al.</i>	(BARI, BGNA, FIRZ)	REFID=20693
BARNHAM	70	PRC 24 1083	K.W.J. Barnham <i>et al.</i>	(BIRM)	REFID=21624
BARTSCH	70B	NP B22 109	J. Bartsch <i>et al.</i>	(AACH, BERL, CERN)	REFID=21625
CASO	70	LNC 3 707	C. Caso <i>et al.</i>	(GENO, HAMB, MILA, SACL)	REFID=20590
STUNTEBECK	70	PL 32B 391	P.H. Stuntebeck <i>et al.</i>	(NDAM)	REFID=20696
ADERHOLZ	69	NP B11 259	M. Aderholz <i>et al.</i>	(AAC3, BERL, CERN+)	REFID=20687
ANDERSON	69	PRL 22 1390	E.W. Anderson <i>et al.</i>	(BNL, CMU)	REFID=20795
ARMENISE	68	NC 54A 999	N. Armenise <i>et al.</i>	(BARI, BGNA, FIRZ+) I	REFID=20054
BALTAZAR	68	PRL 20 887	C. Baltay <i>et al.</i>	(COLU, ROCH, RUTG, YALE) I	REFID=21531
CASO	68	NC 54A 983	C. Caso <i>et al.</i>	(GENO, HAMB, MILA, SACL)	REFID=20586
CRENNELL	68B	PL 28B 136	D.J. Crennell <i>et al.</i>	(BNL)	REFID=21616
JOHNSTON	68	PRL 20 1414	T.F. Johnston <i>et al.</i>	(TNTO, WISC) IJP	REFID=21617
FOCACCI	66	PRL 17 890	M.N. Focacci <i>et al.</i>	(CERN)	REFID=20402
GOLDBERG	65	PL 17 354	M. Goldberg <i>et al.</i>	(CERN, EPOL, ORSAY+)	REFID=21601
